

# IrDA infrared communication module

## RPM872-H7

RPM872-H7 is an infrared communication module for IrDA Ver. 1.2 (Low Power). The infrared LED, PIN photo diode, and waveform shaping LSI are all integrated into one single package. This module is designed for low power consumption. The very small package makes it a perfect fit for mobile devices.

### ●Features

- 1) Applied to IrDA Ver. 1.2. (Low Power)
- 2) Designed for low power consumption at stand-by for receiving (75μA).
- 3) Low operating voltage  
 $V_{CC}=2.0V\sim3.6V$   
 $V_{IO}=1.5V\sim3.6V$   
 $V_{LED}=2.6V\sim5.5V$
- 4) Ultra small package.
- 5) Power down function.

### ●Applications

Cellular phones, PDA, Digital still camera, Handy terminals, and other portable equipments.

### ●Absolute maximum ratings (Ta = 25°C)

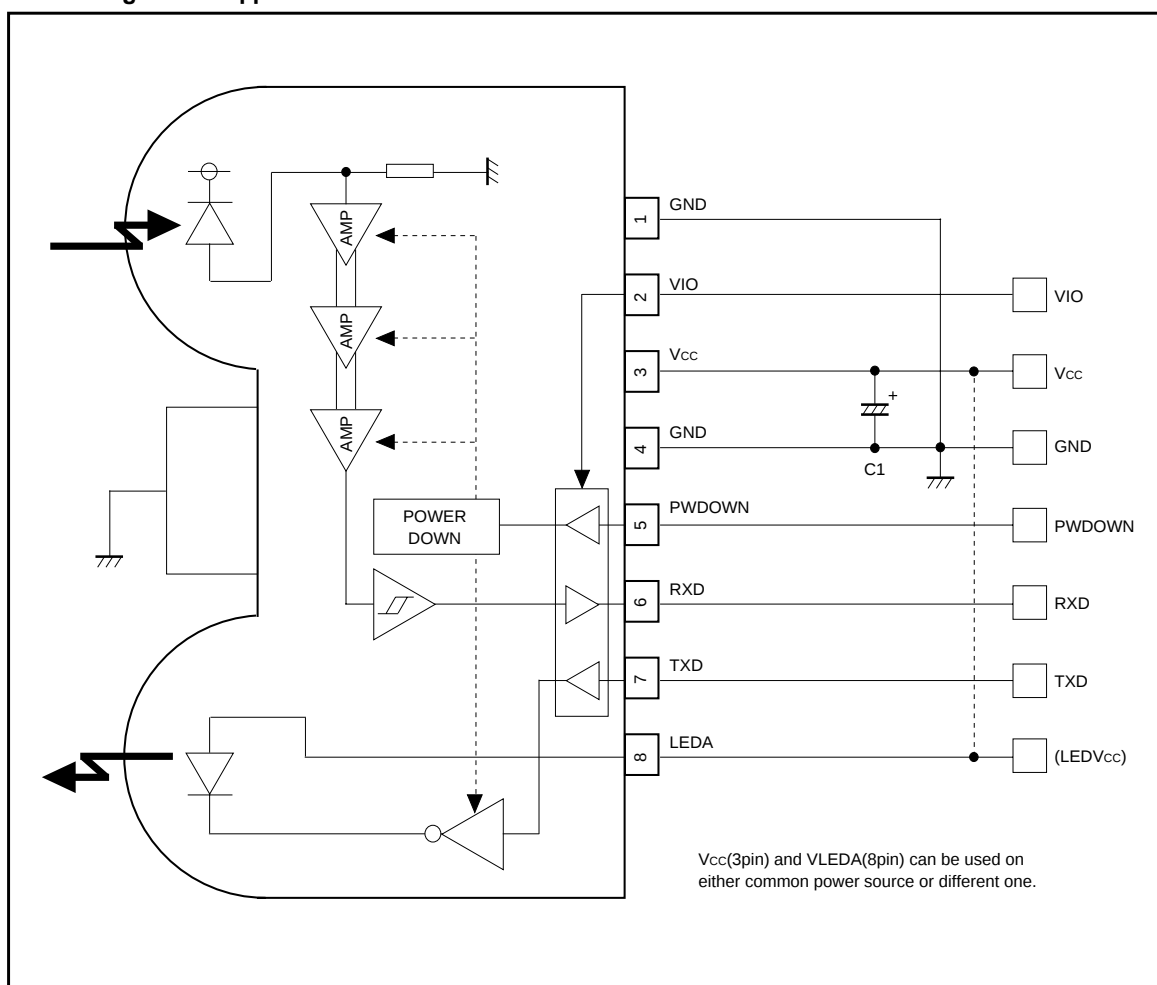
| Parameter             | Symbol    | Limits   | Unit |
|-----------------------|-----------|----------|------|
| Supply voltage        | $V_{CC}$  | 7.0      | V    |
| Power dissipation     | $P_d$     | 100      | mW   |
| Operating temperature | $T_{opr}$ | -20~+85  | °C   |
| Storage temperature   | $T_{stg}$ | -30~+100 | °C   |

### ●Recommended operating conditions (Ta = 25°C)

| Parameter      | Symbol     | Min. | Typ. | Max.     | Unit |
|----------------|------------|------|------|----------|------|
| Supply voltage | $V_{CC}$   | 2.0  | 3.0  | 3.6      | V    |
|                | $V_{LEDA}$ | 2.6  | 3.0  | 5.5      | V    |
|                | $V_{IO}$   | 1.5  | 3.0  | $V_{CC}$ | V    |

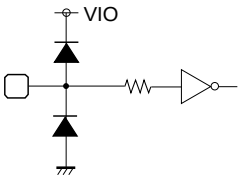
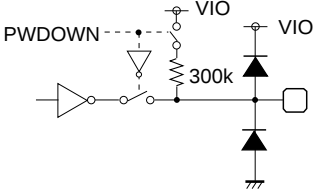
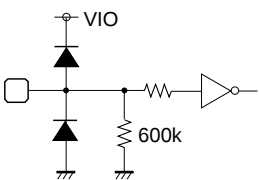
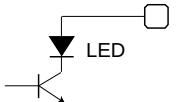
## Photo Link Module

## ●Block diagram and application circuit



## Photo Link Module

## ●Terminal description

| Pin No | Terminal    | Circuit                                                                             | Function                                                                                                                                                                                                 |
|--------|-------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1, 4   | GND         |                                                                                     | GND<br>Pin1 and Pin4 must be connected to the ground.                                                                                                                                                    |
| 2      | VIO         |                                                                                     | VIO<br>Supply voltage for I/O pins (PWDOWN, RXD, TXD)                                                                                                                                                    |
| 3      | Vcc         |                                                                                     | Vcc<br>Supply voltage for Transceiver circuits.<br>For preventing from infection, connect a capacitor between Vcc(3pin) and GND(4pin).                                                                   |
| 5      | PWDOWN      |    | Power-down Control Terminal<br>H : POWERDOWN MODE<br>L : OPERATING MODE<br>CMOS logic level input<br>When input is H, it will stop the receiving circuit, Pin-PD current and transmitting LED operation. |
| 6      | RXD         |  | Receiving Data Output Terminal<br>CMOS logic level output<br>When PWDOWN (5pin) = H, the RXD output will be pulled up to VIO at approximately 300kΩ.                                                     |
| 7      | TXD         |  | Transmitting Data Input Terminal<br>H : LED (ON PWDOWN = L)<br>CMOS logic level input<br>Holding TXD = "H" status, LED will be turn off approximately 48μs.                                              |
| 8      | LED A       |  | LED ANODE Terminal<br>Other power source can be used difference between LEDVcc and Vcc.<br>This can be connected to battery kinds of unregulated voltage source by internal constant current driver.     |
| —      | Shield Case |                                                                                     | Connect to Ground.                                                                                                                                                                                       |

## Photo Link Module

●Electrical characteristics (Unless otherwise noted, V<sub>CC</sub>=3V, V<sub>LEDA</sub>=3V, V<sub>IO</sub>=3V, T<sub>a</sub>=25°C)

| Parameter                | Symbol            | Min.                 | Typ. | Max.                 | Unit | Conditions                                    |
|--------------------------|-------------------|----------------------|------|----------------------|------|-----------------------------------------------|
| Consumption Current 1    | I <sub>cc1</sub>  | –                    | 75   | 99                   | μA   | VPWDOWN = 0V. At no input light               |
| Consumption Current 2    | I <sub>cc2</sub>  | –                    | 0.01 | 0.2                  | μA   | VPWDOWN = V <sub>IO</sub> . At no input light |
| Transmission rate        |                   | 2.4                  | –    | 115.2                | kbps |                                               |
| PDOWN INPUT High Voltage | VPDH              | 2/3*V <sub>IO</sub>  | –    | V <sub>IO</sub>      | V    | V <sub>IO</sub> = 1.8 ~ 3.6 [V]               |
|                          |                   | 1.2                  |      |                      |      | V <sub>IO</sub> = 1.5 ~ 1.8 [V]               |
| PDOWN INPUT Low Voltage  | VPDL              | 0                    | –    | 1/3*V <sub>IO</sub>  | V    | V <sub>IO</sub> = 1.8 ~ 3.6 [V]               |
|                          |                   |                      |      | V <sub>IO</sub> -1.2 |      | V <sub>IO</sub> = 1.5 ~ 1.8 [V]               |
| PDOWN INPUT High Current | IPDH              | -1.0                 | 0    | 1.0                  | μA   | PDOWN = V <sub>IO</sub> [V]                   |
| PDOWN INPUT Low Current  | IPDL              | -1.0                 | 0    | 1.0                  | μA   | PDOWN = 0 [V]                                 |
| <Transmitter>            |                   |                      |      |                      |      |                                               |
| TXD INPUT High Voltage   | VTXH              | 2/3*V <sub>IO</sub>  | –    | V <sub>IO</sub>      | V    | V <sub>IO</sub> = 1.8 ~ 3.6 [V]               |
|                          |                   | 1.2                  |      |                      |      | V <sub>IO</sub> = 1.5 ~ 1.8 [V]               |
| TXD INPUT Low Voltage    | VTXL              | 0                    | –    | 1/3*V <sub>IO</sub>  | V    | V <sub>IO</sub> = 1.8 ~ 3.6 [V]               |
|                          |                   |                      |      | V <sub>IO</sub> -1.2 |      | V <sub>IO</sub> = 1.5 ~ 1.8 [V]               |
| TXD INPUT High Current   | ITXH              | 2.5                  | 5    | 10                   | μA   | TXD = V <sub>IO</sub> [V]                     |
| TXD INPUT Low Current    | ITXL              | -1.0                 | 0    | 1.0                  | μA   | TXD = 0 [V]                                   |
| LED ANODE Current        | I <sub>LEDA</sub> | –                    | 30.5 | –                    | mA   |                                               |
| <Receiver>               |                   |                      |      |                      |      |                                               |
| RXD OUTPUT High Voltage  | VRXH              | V <sub>IO</sub> -0.4 | –    | V <sub>IO</sub>      | V    | I <sub>RXH</sub> = -200μA                     |
| RXD OUTPUT Low Voltage   | VRXL              | 0                    | –    | 0.4                  | V    | I <sub>RXL</sub> = 200μA                      |
| RXD OUTPUT Rise Time     | t <sub>RR</sub>   | –                    | 35   | –                    | ns   | C <sub>L</sub> = 15pF                         |
| RXD OUTPUT Fall Time     | t <sub>FR</sub>   | –                    | 35   | –                    | ns   | C <sub>L</sub> = 15pF                         |
| RXD OUTPUT Pulse Width   | t <sub>wRXD</sub> | 1.5                  | 2.3  | 4.2                  | μs   | C <sub>L</sub> = 15pF, 2.4~115.2kbps          |
| Receiver Latency Time    | t <sub>RT</sub>   | –                    | 100  | 200                  | μs   |                                               |

●Optical characteristics (Unless otherwise noted, V<sub>CC</sub>=3V, V<sub>LEDA</sub>=3V, V<sub>IO</sub>=3V, T<sub>a</sub>=25°C)

| Parameter             | Symbol                          | Min.   | Typ. | Max. | Unit                 | Conditions                  |
|-----------------------|---------------------------------|--------|------|------|----------------------|-----------------------------|
| Peak wave length      | λ <sub>P</sub>                  | 850    | 870  | 900  | nm                   |                             |
| Intensity 1           | I <sub>E1</sub>                 | 4.0    | 10   | 26   | mW / Sr              | -15° ≤ θ <sub>L</sub> ≤ 15° |
| Half-Angle            | θ <sub>L</sub> / 2              | –      | ±18  | ±30  | deg                  |                             |
| Optical pulse width   | T <sub>WLED</sub>               | 1.42   | 1.63 | 2.02 | μs                   | TXD=1.63μs pulse input      |
| Rise time / Fall time | T <sub>r</sub> / T <sub>f</sub> | –      | –    | 100  | ns                   | 10%~90%                     |
| Optical over shoot    |                                 | –      | –    | 25   | %                    |                             |
| Edge jitter           | T <sub>j</sub>                  | -40    | –    | 40   | ns                   |                             |
| Irradiance in angular | E <sub>e</sub>                  | 0.0068 | –    | 500  | mW / cm <sup>2</sup> | -15° ≤ θ <sub>L</sub> ≤ 15° |
| INPUT Half-Angular    | θ <sub>D</sub> / 2              | ±15    | –    | –    | deg                  |                             |
| Maximum Emitting Time | T <sub>LEDmax</sub>             | 16     | 48   | 120  | μs                   | TXD=V <sub>IO</sub>         |

1.This product is not designed for protection against radioactive rays.

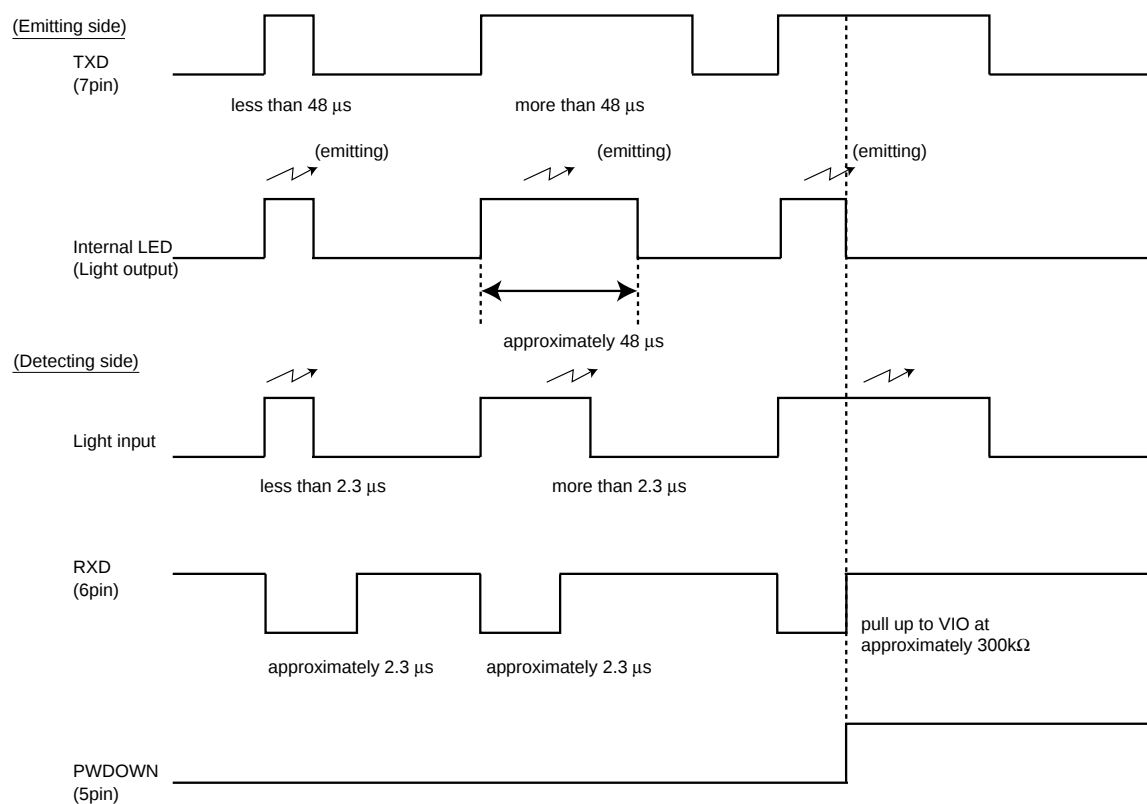
2.This product dose not include laser transmitter.

3.This product includes one pin photo diode.

4.This product dose not include optical load.

## Photo Link Module

## ●Timing chart



## ●Recommended values

| Part symbol | Recommended value                                           | Notice                                                              |
|-------------|-------------------------------------------------------------|---------------------------------------------------------------------|
| C1          | 1 $\mu$ F, tantalum or ceramic<br>Ex.) TCFGA1A105M8R (ROHM) | Bigger capacitance is recommended with much noise from power supply |

## Photo Link Module

## ●Notes

1) VLEDA(8pin), V<sub>CC</sub>(3pin) and VIO(2pin)

- Other power source can be used difference between VLEDA and V<sub>CC</sub> and VIO. ( $VIO < V_{CC} + 0.3V$ )

## 2) Caution in designing board lay-out

To get maximum potential from RPM872-H7, please keep in mind following instruction.

- The line of RXD (6pin) should be connected at backside via through hole close to RPM872-H7 pin lead. Better not to be close to photo diode side (1pin).

⇒ This is to minimize feedback supplied to photo diode from RXD.

- As for C1 between 3-4 pin should be placed close to RPM872-H7.
- Better to be placed more than 1.0cm in radius from photo diode (pin1 side) and also away from the parts which generates noise, such as DC / DC converter.

## 3) Others

- Please be sure to set up the TXD (7pin) input to be "L" (under 0.3V) except transmitting data (for  $< 90\mu s$ . On duty  $< 20\%$ ).
- Powerdown current might increase if exposed by strong light (ex. direct sunlight) at powerdown mode.
- Please use by the signal format which is specified by IrDA Ver1.2 (Low Power). There might be on error if used by different signal format.
- Dust or dirt on lens portion may affect the characteristics, so pay sufficient attention.

## 4) Eye Safe

- IEC825-1 (EN60825-1) Class 1 Eye Safe.

## ●External dimensions (Units : mm)

